Spatial knowledge dynamics from a firm perspective: The use of innovation biography to grasp time and space in energy technology development

Tanner, Anne Nygaard

Publication date:
2012

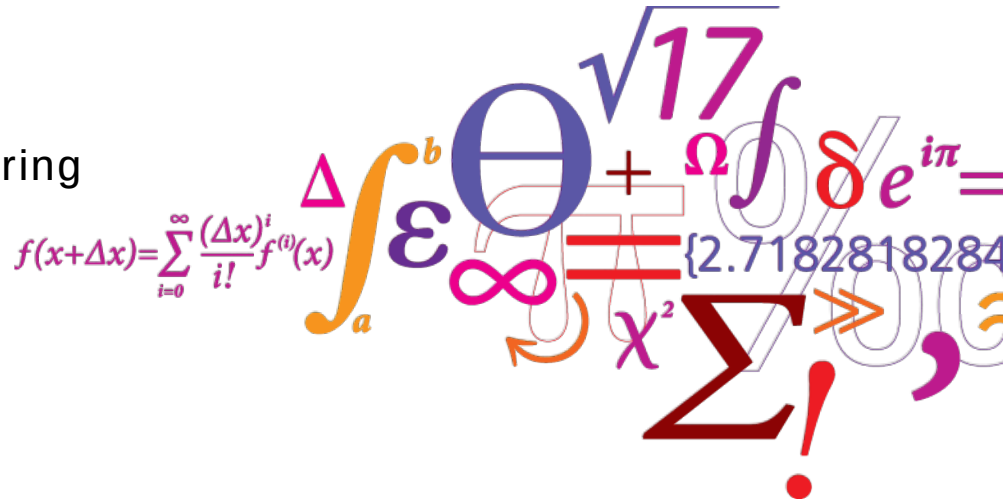
Document Version
Publisher's PDF, also known as Version of record

Spatial knowledge dynamics from a firm perspective:
The use of innovation biography to grasp time and space in energy technology development

NoRSA, October 3-5 2012

Svanneke

Anne Nygaard Tanner
Technical University of Denmark
Department of Management Engineering



DTU Management Engineering
Institut for Systemer, Produktion og Ledelse

About the project

- Post doctoral position funded by the Danish Council for Strategic Research, the Programme Commission on Sustainable Energy and Environment via the **Strategic Research Alliance for Energy Innovation in Denmark (EIS)**
  - The alliance runs from 2011 to 2016
  - Partners are: DTU, Aalborg University, CBS, Aarhus University, NIFU, Chalmers; EAWAG, Chalmers University, ZEW (Centre for European Economic Research)

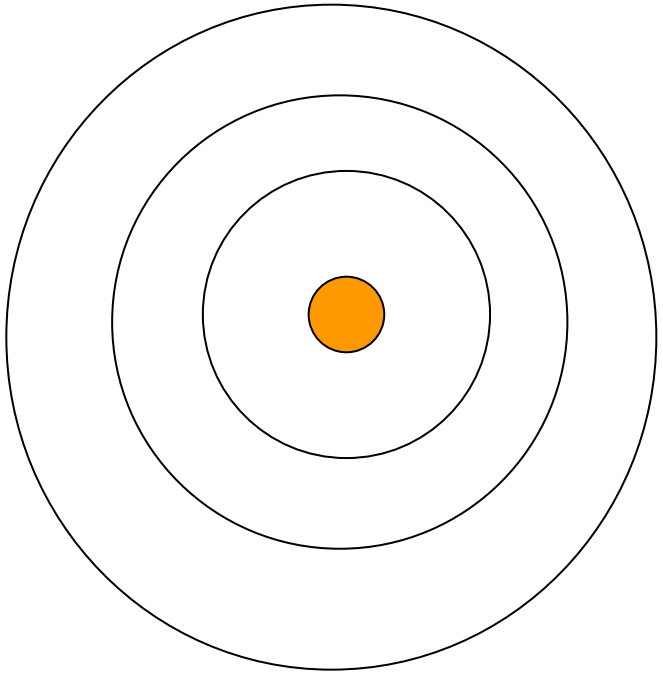
"The purpose of the strategic research alliance is to analyse the nature of the energy innovation systems in Denmark, seen as part of an international context, and to connect leading Danish and international researchers analyzing energy innovation systems"

Postdoc: Localized learning and global knowledge networks in emerging industries

- This study focus on how firms integrate external knowledge into their internal innovation process

- The study focuses on two dimensions:
  - Geography
  - Type of Knowledge

- The empirical analysis is carried out on the wind turbine industry located in DK



Framing

- Starting point
  - Firms innovate by combining existing and new knowledge
  - Rely on external knowledge in their innovation process
  - A firm's ability to acquire external knowledge is constrained by the firm's own experiences and competences (Nelson and Winter 1982, Dosi 1988)
  - And it has also been claimed that a firm is constrained by its technological and geographical distances to the sources of knowledge (Antonelli 2001, Jaffe et. al 1993)

"One needs to have substantial in-house capacity in order to recognize, evaluate, negotiate and finally adapt the technology available from others"

(Dosi 1988)

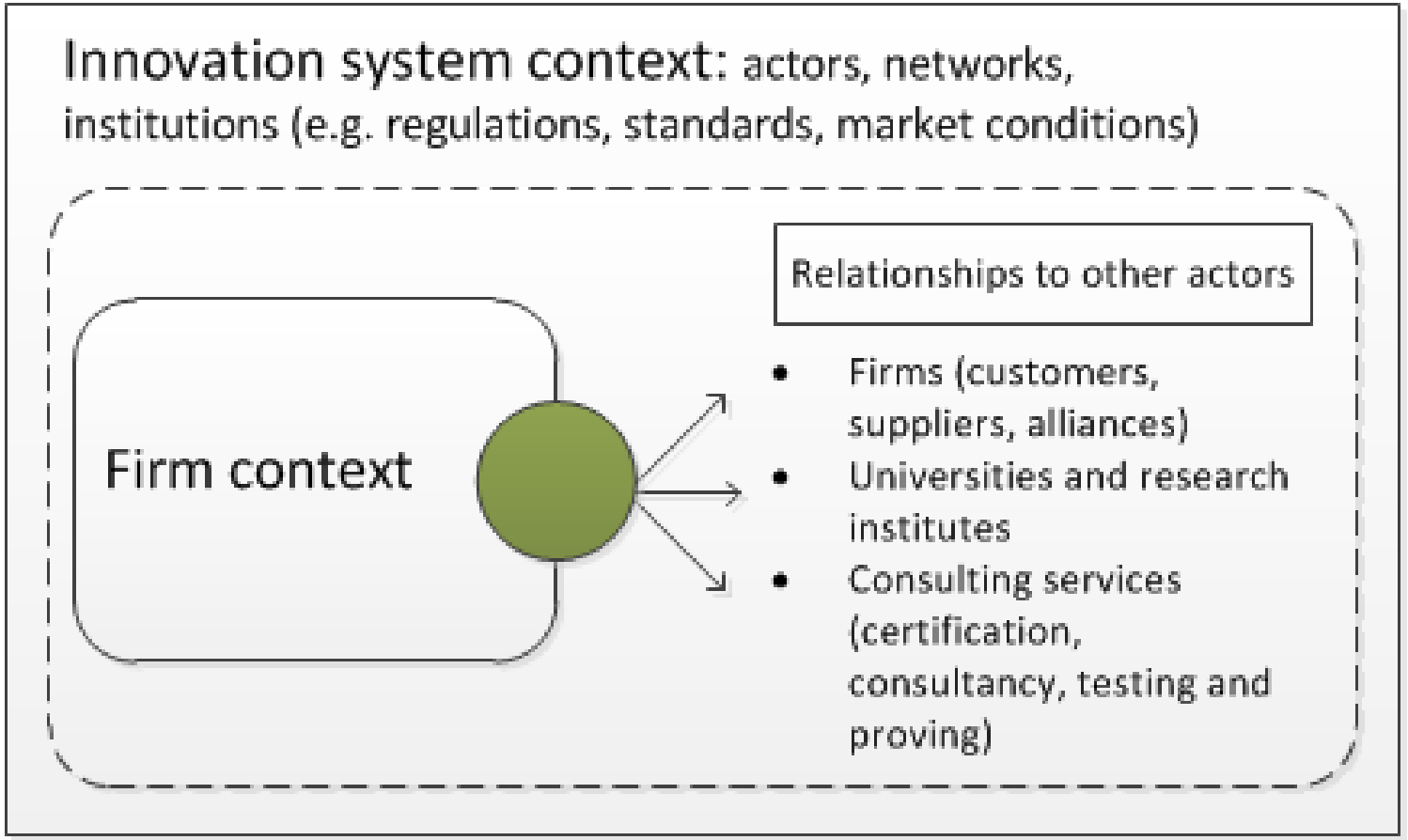
Previous studies have focused

- On the degree to which firms collaborate internationally (Gertler and Levitte 2005, Murtha et al. 2001)
- Identifying the external sources of knowledge such as labor mobility and strategic alliances (Rosenkopf and Almeida 2003) Networks and collaboration, Licensing and patenting (Gertler and Levitte 2005)

Method

- Inductive methodology following a grounded theory approach
- Important to achieve a balance between interpretation and data:
  - Begin data gathering process early while
  - Continuously modifying the research question
  - Develop/refining a plan
  - refining the method used to gather data
  - Initiating a data dependent coding

- Data gathering method: biographical approach with focus on the innovation event (Inspired by the EURODITE project, e.g. Strambach 2012) including:
  - Actors involved
  - Relationship between them
  - The knowledge contributions
  - Geographical and institutional settings



Analytical Model: Innovation process at the micro level and how it is embedded in a macro context of the larger TIS

Data collection process is balanced between **the narrative of the project** owner and a focus on the **firm's context and its linkages** to other partners in the process of innovation

Plan for the empirical work

- Focus on the wind power industry in Denmark
- Intention to interview suppliers and sub-suppliers
  - 5-6 cases representing small and large companies, manufacturing and knowledge intensive companies
  - 2+ interviews for each case

The globalization of the wind power industry

Wind power in Denmark (anno 2011):

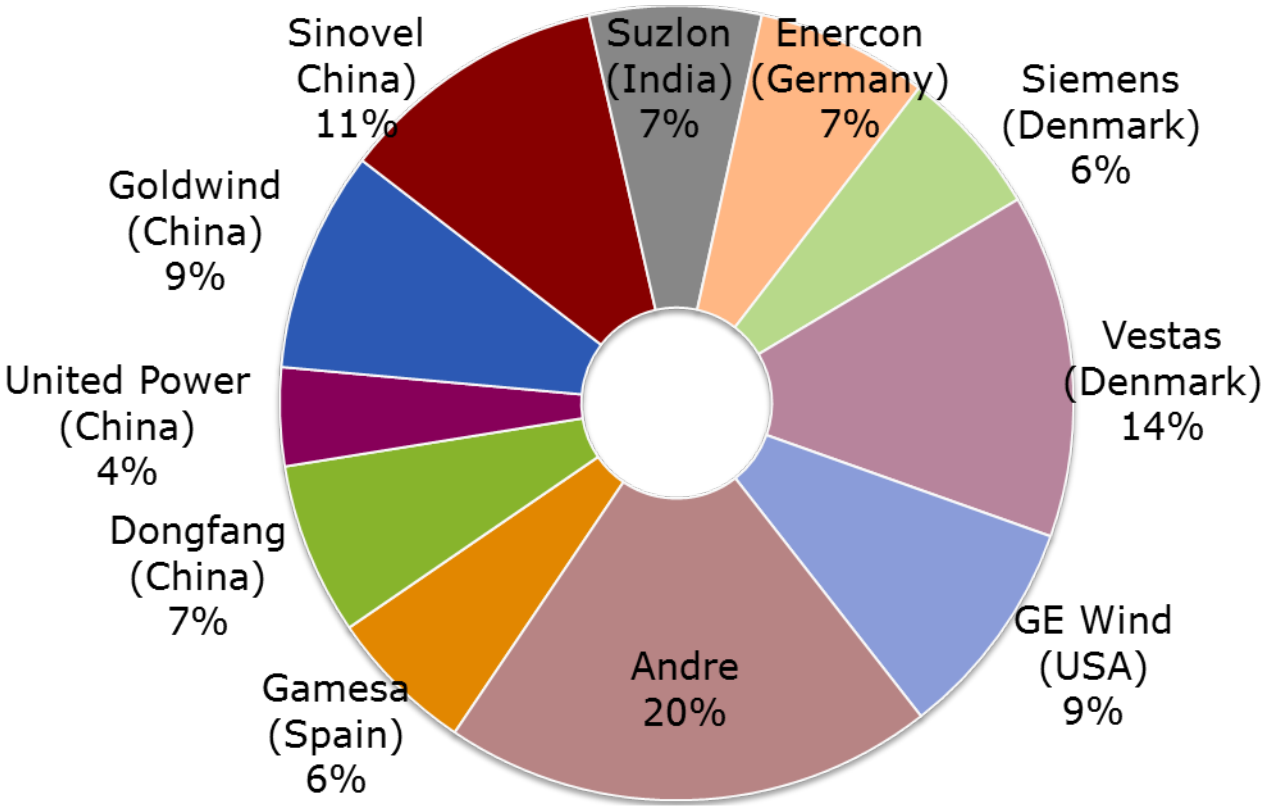
- 25,000 employees,
- Global turnover 102.8 bn.
- Danish turnover approx. 52 bn.

- From 2006-2011 wind power related export from Denmark has increased by 8 % per year
- However: -16.1 % from 2010-2011

- Global distribution of production 2010:
  - Europe – 41 %
  - China and India – 48%

- Manufacturing companies are global
  - Danish suppliers have followed this trend

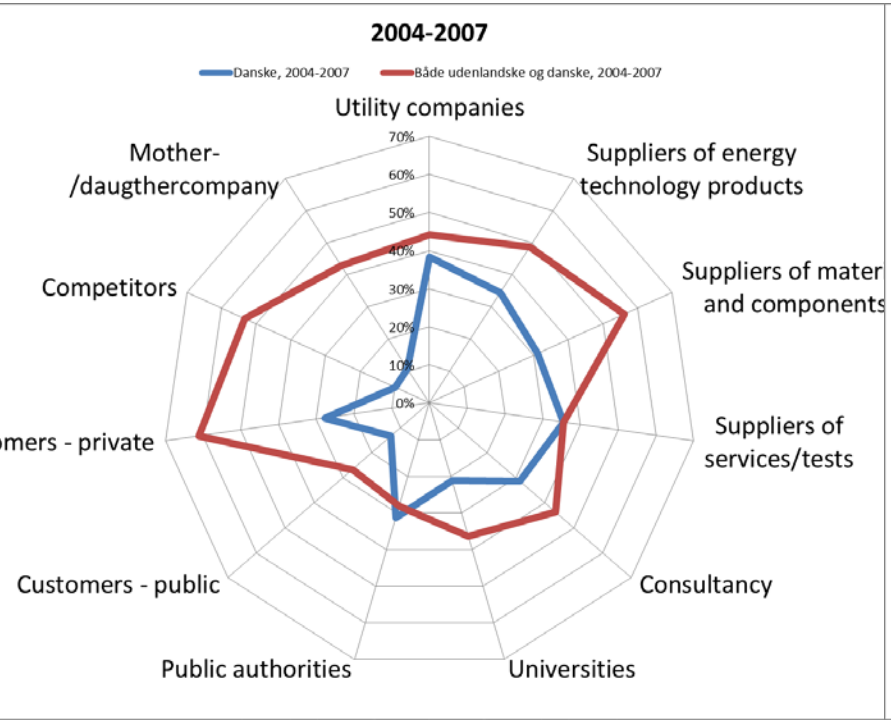
Global wind power industry

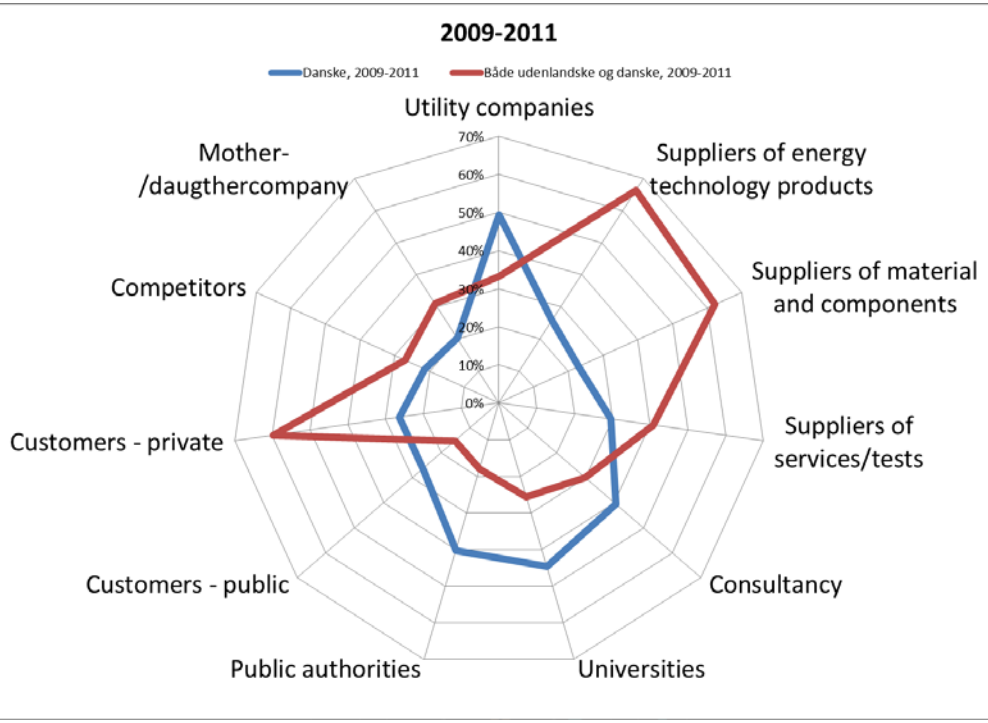


Largest producers of wind turbines in 2010 based on market shares

- Globalization of the wind power industry is driven by the spatially distributed demand for installed MW wind power – public provisions for shares of locally manufactured components

Collaboration patterns – based on EIS survey





First insight

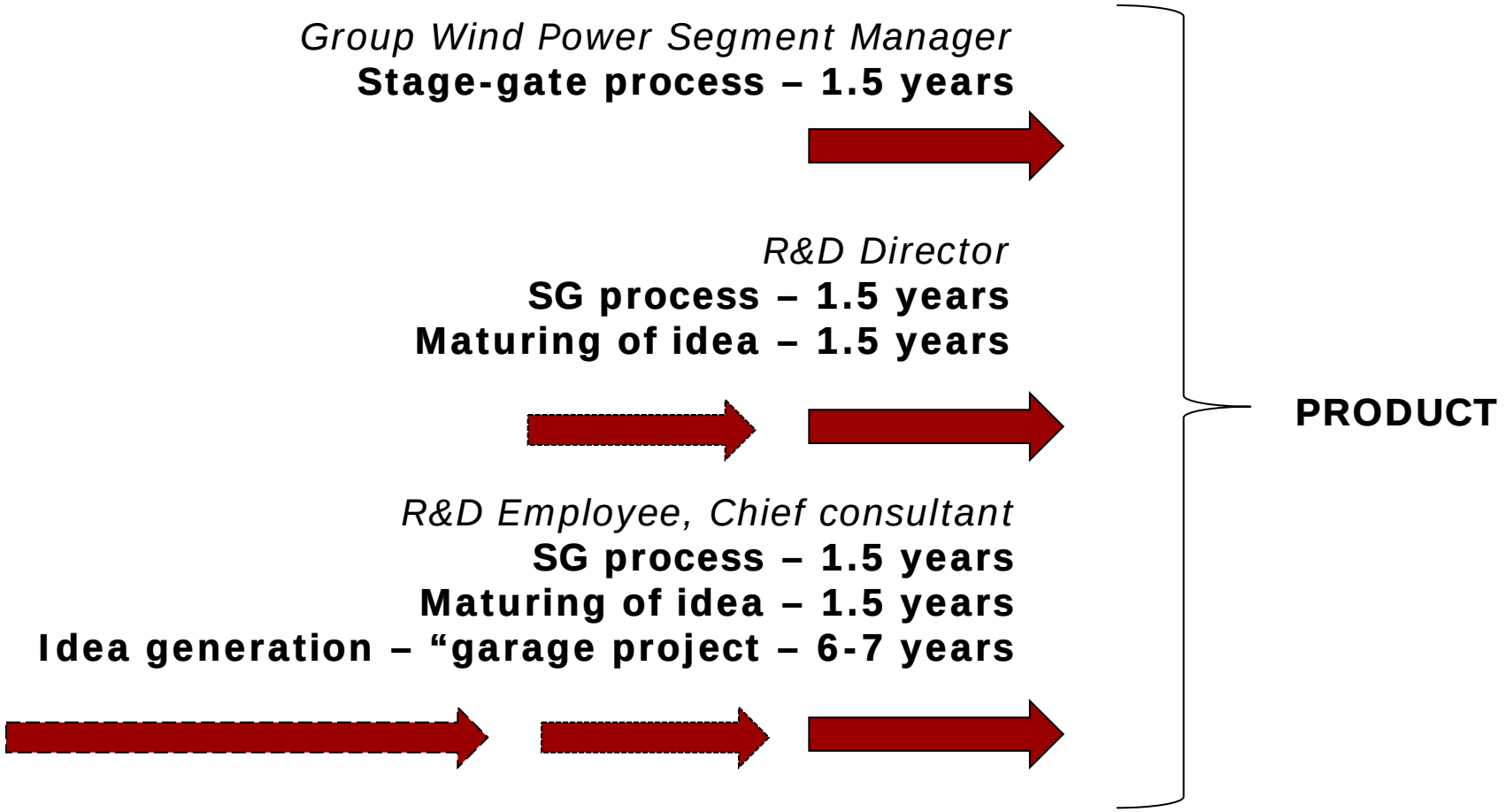
Hempel is a global firm:

- in the sense it is a multinational company having R&D offices around the world
- They do not distinguish between local/global knowledge – focus is on the best expertise
- High mobility of R&D employees – benefits the firm because it helps them align and streamline the practice of the firm in all their R&D-divisions around the world
- Regional R&D-initiatives which are aimed at the (world) regional markets. Sometimes these projects have a global potential and needs coordination from the Danish headquarter – in order to align the product standard so the product can enter the European markets

But also strong local anchoring:

- The importance of being close to the user! User-driven innovation understood as having an intensive knowledge about the industry's needs.
  - Today a strong need in the wind turbine industry is cost reductions, hence improvement of productivity and efficiency

One insight from using the innovation biography on time perception



So far… so good?

- The advantage of the biographical approach is
  - It provides concrete insight into tangible procedures of innovation processes without using the methods of observation studies
  - Avoid “listening” to a firm’s intended procedure or the *ideal situation*, which managing directors or head of R&D-departments usually will give you

- The disadvantage is that it is very time consuming □

- On findings… it is a process
  - and it can be hard to detect the local-global duality in the innovation process and not least its implications